DR-54. SYNTHESIS, CHARACTERIZATION AND COMPARISON OF NEW IONIC LIQUIDS DERIVED FROM IMIDAZOLE

F. T. Y. Kasuga, A. V. Pedroso, R. T. Ferreira, G. Marciniuk, R. B. Estevam, M. A. Voinarovicz, A. S. Ribas, F. S. Santos, J. R. Garcia

Department of Chemistry of the State University of Ponta Grossa,
Av. Gal. Carlos Cavalcanti, 4748 – Uvaranas, Ponta Grossa – PR, Brazil, 84030-900

E-mail: felipekasuga@gmail.com

Research on ionic liquids has grown formidably in the early years of this century, due to the attractiveness of their physical-chemical properties such as, high thermal stability, non-volatility [1], high ionic conductivity, no flammability and easy operation at liquid state [2]. In addition, ionic liquids are also used as solvents with a high market value. Furthermore, in the last decade, a new class of biocompatible and environmental-friendly ionic liquids has emerged. Based on the above facts, there are need and considerable interest in the discovery of low cost ionic liquids which having similar physical-chemical properties as described in the literature. Thus, the present work aimed to synthesis and characterization of new ionic liquids derived from imidazole. Initially, an alkylation reaction was carried out between the imidazole and ethyl bromide under reflux conditions. Then the resulting product was refluxed again with tetrafluoroborate to promote the ionic exchange. The same procedure of imidazole modification was performed with 1-hexylpyrrole to obtain another product. This product was also submitted to an ionic exchange process. The chosen of the 1-hexylpyrrole was made so the obtained molecule could present a greater stability. The final products were purified by chromatography and characterized by NMR and electrochemical analysis.

The electrochemical behavior of the tetrafluoroborate 1,3-diethyl imidazole and the tetrafluoroborate 1,3-dihexylpyrrole imidazole was evaluated via cyclic voltammetry using a Pt wire as working electrode in a windows from –4V to + 4V (vs. Ag/AgCl(sat)). For comparative purposes, the ionic liquids behavior were compared to the electrochemical window of a platinum electrode in a 1,0 mol L^{-1} aqueous solution of $H_2SO_{4(l)}$. The ionic liquid tetrafluoroborate 1,3-dihexylpyrrole imidazole has a window of potential from –4,0 V to + 4,0 V. When compared to the tetrafluoroborate 1,3-diethyl imidazole, the 1,3-dihexylpyrrole imidazole presents a greater stability and a electrochemical window broader. Due to its greater electrochemical stability the 1,3-dihexylpyrrole imidazole is a better choice as a probable ionic liquid aims the application in the recovery of certain metals by electrochemical reduction process. However, it is necessary an optimization of synthesis parameters in order to increase the potential window and other physical-chemical characteristics of the ionic liquid.

References

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